THE DENTAL PRACTITIONER

AND DENTAL RECORD

Including the official reports of the British Society of Periodontology, the British Society for the Study of Orthodontics, the European Orthodontic Society, the Glasgow Odontological Society, the Liverpool and District Odontological Society, the North Staffordshire Society of Dental Surgeons, the Odonto-chirurgical Society of Scotland, and the Dental and Medical Society for the Study of Hypnosis

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THE DENTAL PRACTITIONER
AND DENTAL RECORD

Vol. VIII, *No.* 9 — *May*, 1958

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THE DENTAL PRACTITIONER AND DENTAL RECORD

Vol. VIII, No. 9 May, 1958

EDITORIAL

"WHAT NOISE CAN DO"

THIS was the title of a B.B.C. programme put out on the Home Service on May 12. It dealt with the effects of excessive noise at work. Most people can apparently get used to noise, particularly if the noise is made by the person himself. However, this is not the same as being affected by it. The ultimate effects depend on the length of time that one is exposed to continuous intense sound. While never actually causing complete deafness, it can cause damage and produce impaired hearing. In addition to partial deafness, noise may also produce side-effects, such as tiredness and lack of concentration, possibly owing to the difficulty of speaking during periods of high intense noise—such as the noise of a jet engine. The programme dealt with modern industrial noises and the effect on people who work surrounded by intense noises.

Dentistry produces its own peculiar noises, which are in fact the real bugbear of dental treatment. There are four unpleasant factors in dental treatment: heat, pain, noise, and vibration. The first two—heat and pain—have been overcome by modern methods of water spraying and anæsthesia. If the noise and vibration of cavity preparation could be completely eliminated, dentistry could be performed in perfect comfort for the patient. Some years ago, Northwestern University, Chicago, produced a series of recordings of dental noises. The microphone was attached to the bone behind the ear and recordings were made during various operations, which included the use of burrs, stones, diamond instruments, and chisels. The recordings when heard were almost unbelievable, but it was noticeable that the amount of bone conduction of noises and vibrations was very much reduced by the use of diamonds and an efficient water spray. On all the instruments used there was a notable decrease in the effects when a water spray was used, which presumably had a damping effect. Even with the use of modern high-speed diamonds with an efficient water spray, the problem of noise and vibration still remains. The profession is still very conscious of these two unpleasant factors and the use of the air abrasive and ultrasonic machines have both claimed the advantage of reducing the noise for the patient to a minimum. The whistle from the new air turbine handpieces has produced a further noise which is more likely to affect the operator than the patient. An amusing aspect of the turbine whistle is for the operator to feint deafness when he is asked if he has been affected by the high-pitched whine of the handpiece.

So much work has now been done on the effect of noises and vibration in dentistry that we feel we can say that somewhere in the not too distant future these two unpleasant side-effects of dentistry will undoubtedly be eliminated.

DIMENSIONS OF CAST PALATAL AND LINGUAL BARS*

By **J. N. ANDERSON**, M.D.S. (Sheff.)
Dental School, University of St. Andrews

On examining closely the dentures displayed as examples of partial denture design at various meetings, and on reviewing illustrations in the modern literature, it is apparent that there is a wide variation in the dimensions suggested for these structures. Greater variations are seen in the dimensions of palatal bars than of lingual bars. In the lower jaw, a lingual connector is either similar in section to a wrought oval wire, is of D-shaped section, or is a broad plate. Palatal connectors, however, may be broad and relatively thin, or narrow and of thick section.

It is generally agreed (Osborne and Lammie, 1954) that connectors must be rigid if the load of masticatory stress is to be shared by all the tissues supporting the denture. This is a fundamental principle of partial denture design where posterior teeth are being replaced.

A palatal or lingual (or buccal) bar should therefore act as a rigid connector between the saddle areas, yet it must be of as small dimensions as possible. Its bulk and shape should be such that its presence in the mouth is easily accepted by the patient, and more particularly by the patient's tongue.

The width and thickness of a connecting bar control its strength in resisting permanent deformation, and also its rigidity under masticatory stress.

When comparing casting alloys for skeleton dentures, the emphasis has previously been placed on their yield strength. In practice, however, it appears that permanent distortion of a connecting bar is not often found, except when a white-gold alloy has been used. Permanent bending of cast dentures occurs more frequently out of the mouth during cleaning, or whilst the denture reposes in the pocket or handbag of the patient. If a denture is worn throughout the day, it receives only masticatory stresses and these are not usually sufficient to change its shape permanently. The smaller the bulk of the denture, the more readily will the patient wear it constantly. In other words, the less bulky the denture, the more readily is it worn, and the safest place for a partial denture is in a patient's mouth.

Table I.—Result of Survey (Comments on the palatal and lingual bars. *Figs.* 1–4)

Dimension		Palatal Bar		Lingual Bar	
		Gold *Fig.* 1	*Chrome-cobalt* *Fig.* 2	*Gold* *Fig.* 3	*Chrome-cobalt* *Fig.* 4
Breadth	Too great	1	6	14	1
	Too small	25	2	1	7
	Correct	3	21	14	21
Thickness	Too thick	22	4	10	10
	Too thin	0	2	0	0
	Correct	7	23	19	19

Palatal and lingual bars should therefore be made in the smallest bulk which will produce rigidity under masticatory forces. If this requirement is fulfilled, then they will also be sufficiently strong to resist slightly greater forces during cleaning.

When designing a structure to be used in the mouth, it is not possible to work out mathematically for each denture the stresses and resulting strains from the application of chewing forces, as these forces are difficult to estimate and in some cases unknown. Recent work (Anderson, D. J., 1956; Lesley, 1955; Regli and Kydd, 1953; and Yurkstas and Curby, 1953) has shed some light on this subject, but the shape and section of most dental structures are so complex that mathematical determination of their correct dimensions is extremely difficult.

The literature on dental materials (Anderson, J. N., 1956; Brumfield, 1953; and Skinner, 1954) makes comparisons between the various alloys used in partial denture construction, but nowhere has reference been found giving the

* A paper read before the British Society for the Study of Prosthetic Dentistry, April, 1957.

actual dimensions in which they should be used. The correct size of lingual and palatal connectors seems to lie mainly, like beauty, in the eye of the beholder, or in the mind of the technician who waxes up the pattern for the pre-formed patterns and waxing dies. The first of these was the "Ney" waxing die. This was followed by other dies and by several types of pre-formed patterns in both wax and plastic material. All these are in general use to-day,

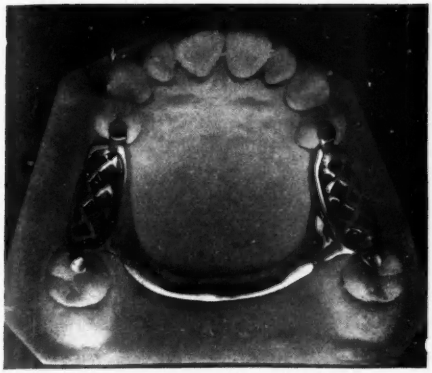

Fig. 1.—Gold palatal bar (after Ney).

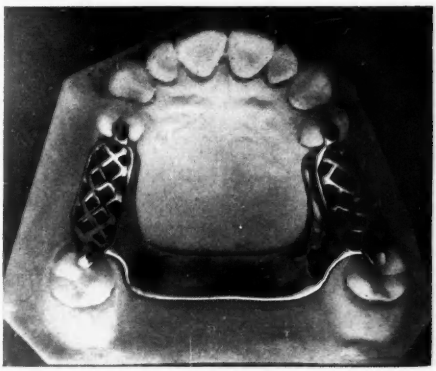

Fig. 2.—Chrome-cobalt alloy palatal bar.

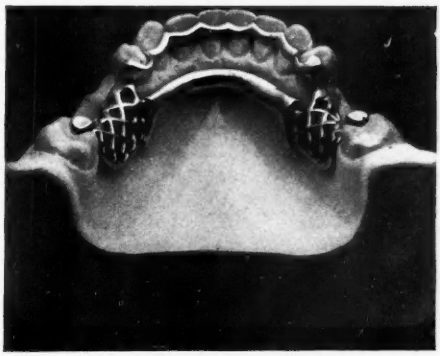

Fig. 3.—Gold lingual bar (after Ney).

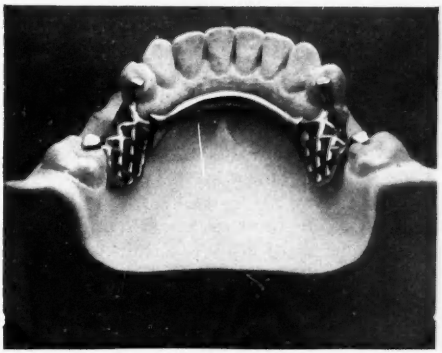

Fig. 4.—Chrome-cobalt alloy lingual bar.

denture. Without a definite starting-point of dimension it is difficult to compare results of denture design, or to compare the advantages of the various alloys available to-day. One reads in the literature, for example, that a chrome-cobalt alloy, being stronger than a gold alloy, can be used in thinner sections. Thinner than what?

Dimensions are known for lingual bars made from oval wire in both yellow gold and stainless-steel. Oval bar No. 2 is the one most frequently used. Indirect indication of dimensions is also given by the provision of together with techniques of freehand wax carving, using casting waxes of known thickness as a basis.

In a recent survey by the writer, denture castings were sent to the Prosthetic Departments of many of the British Schools, together with a questionnaire asking for their comments on the dimensions of the lingual and palatal bars.

The castings are shown in *Figs.* 1–4, whilst the comments are given in *Table I.*

As a starting-point for discussing the correct dimensions of connectors in relation to their

rigidity, I have selected the Ney waxing die palatal and lingual bars as being suitable for use with hardened yellow-gold alloys. This starting-point may, or may not, be correct, but in my mind this section produces a degree of rigidity which is correct for a posterior palatal or lingual bar of average length.

The degree of rigidity of a structure is shown by its deflection when a load is applied. The deflection of a bar of metal is related to its length and to its flexural rigidity. Deflection varies with the cube of the span or length of the bar, and inversely with its flexural rigidity. The latter property is obtained from the product of the modulus of elasticity of the material used and the moment of inertia of the section of the bar.

$$\text{Deflection} \propto \frac{L^3}{E.I}$$

where L=length of bar
E=modulus of elasticity
I=moment of inertia.

The moment of inertia is given by:—

$$I=\frac{B.D^3}{12}$$

where B=breadth of the bar
D=thickness of the bar.

If we assume, from practical experience, that a certain metallic section is sufficiently rigid for oral use when applied to a connector of a certain length, then we can compare sections of other alloys by measuring their flexural rigidity ($E.I$). If two palatal bars of the same length, A and B, are to show the same rigidity under the same masticatory stress, then $E_A.I_A=E_B.I_B$.

The Ney posterior palatal bar dimensions are $0{\cdot}21\times0{\cdot}062$ in. in a D-shaped section. Assuming this section to be an idealized rectangle of $0{\cdot}2\times0{\cdot}05$ in., its moment of inertia is

$$\frac{B.D^3}{12}=21\times10^{-7}\text{ in.}^4.$$

Then the moment of inertia of a chrome-cobalt bar of the same length with the same rigidity should be:—

$$21\times10^{-7}\times\frac{E_{\text{Gold}}}{E_{\text{Cr.Co.}}}$$

Taking average figures (Anderson, 1956) of

E_{Gold} 8250 tons per sq. in.

$E_{\text{Cr.Co.}}$ 12,000 tons per sq. in.

$I_{\text{Cr.Co.}}=14\times10^{-7}$ in.^{4}.

It should be noted that though the moment of inertia of a section of metal varies directly with the width of the structure, it varies with the cube of the thickness. Since, from *Table I*, there appears to be a tendency to-day to use broad palatal bars, this relation between dimensions and rigidity of section should be afforded due weight in deciding their dimensions. For example, doubling the width of a palatal bar does not enable one to halve its thickness, but only to reduce it by approximately one-fifth.

Table II.—Suggested Posterior Palatal Bar Widths in Various Dental Gauges
(Length of bar $1\frac{1}{4}$–$1\frac{3}{4}$ in.)

Thickness		Chrome-cobalt	Yellow Gold	White Gold
Dental gauges	*Size*			
	in.	in.	in.	in.
g. 8	0·022	*	*	*
2×g. 5	0·024	1·25	*	*
1 g. 5+1 g. 6	0·028	0·75	*	*
2×g. 6	0·032	0·5	0·8	0·95
1 g. 6+1 g. 7	0·036	0·4	0·55	0·7
2×g. 7	0·040	0·3	0·4	0·5
2×g. 8	0·044	0·25	0·35	0·4

* The necessary width here is too great to be called a palatal bar.

The chrome-cobalt upper denture which was circulated (*Fig.* 2) was 0·037 in. thick and 0·34 in. wide, giving the above moment of inertia. The palatal bars in *Figs.* 1 and 2 are therefore comparable for rigidity.

Taking figures for modulus of elasticity of 12,000, 8250, and 6750 tons per sq. in. for chrome-cobalt, yellow gold, and white gold respectively, a comparison between palatal bars of similar rigidity can be made. *Table II* shows the suggested width of bar necessary in various dental gauges. The breadth for the narrower bars is that suggested for a slightly rounded section, and is slightly greater than

that required if the section is rectangular. With broader bars, the section tends to be more rectangular, and the moment of inertia can be obtained from direct measurements of the bar.

Since the deflection varies as the cube of the length of the bar, a shorter palatal connector, for example a middle palatal bar, can be made

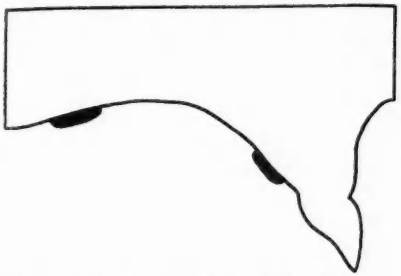

Fig. 5.—Relationship of anterior and posterior palatal bars.

of much smaller section. A middle palatal bar is commonly only 1–1¼ in. long, compared with a posterior palatal bar which is approximately 1¼–1¾ in. long. It can therefore be made either three-quarters the thickness of a posterior palatal bar and the same width, or two-fifths the width and of the same thickness. From the survey noted above, and from the literature, the tendency to-day appears to be one of making a middle palatal bar broad, and therefore suggested dimensions of middle palatal bars are given in *Table III*.

The figures given in *Tables II* and *III* are, of course, only approximate. Slightly different dimensions would be necessary if an alloy possessing a greater or less modulus of elasticity was used. A heavier section of bar will be necessary where the palatal vault is deep, as this will increase the length of the connector. It is considered, however, in the light of the writer's experience, that these tables indicate in general terms the correct dimensions of palatal bars necessary to produce a rigid connector.

Table III.—Suggested Middle Palatal Bar Widths in Various Dental Gauges (Length of bar 1–1¼ in.)

Thickness		Chrome-cobalt	Yellow Gold	White Gold
Dental gauges	*Size*			
	in.	in.	in.	in.
g. 8	0·022	0·7	1·0	1·25
2×g. 5	0·024	0·55	0·8	1·0
1 g. 5+1 g. 6	0·028	0·35	0·5	0·65
2×g. 6	0·032	0·2	0·35	0·4
1 g. 6+1 g. 7	0·036	0·18	0·25	0·3
2×g. 7	0·040	*	0·18	0·2
2×g. 8	0·044	*	*	0·15

* Not practicable.

The dimensions given are those required in the finished denture. From measurements taken of chrome-cobalt dentures made in the laboratory of the Dental School, University of St. Andrews, approximately 10 per cent of the thickness of the waxed-up denture is lost due to grinding and polishing.

Table IV.—Comparison of the Rigidity of Cast and Wrought Lingual Bars

Material	Dimensions	Idealized Rectangle	$I.\frac{B.D^3}{12}$	E	Flexural Rigidity $I.E$
	in.	in.			
Ney waxing die lingual bar. Yellow gold	0·15×0·075	0·13×0·06	20×10^{-7}	8250	16×10^{-3}
Chrome-cobalt denture (*Fig.* 4)	0·125×0·065	0·105×0·055	14×10^{-7}	12,000	17×10^{-3}
Wrought S.S.	0·112×0·061	0·1×0·05	10×10^{-7}	15,000	15×10^{-3}

Where two palatal bars are used, their widths should total those given in *Table II* for posterior bars. Some reduction in section is possible, however, where the long axes of the section of the bars do not lie in the same plane. For example, a posterior and anterior palatal bar may be related as in *Fig.* 5. Here the combined structure is similar to that of an

angle-girder, and a reduction in total section is possible. When the axes of the bars are at right angles to each other, then the breadth of one bar must be considered as the thickness (*D*) when deducing the moment of inertia of the structure. Hence the advantage of designing a denture on the "ring" principle, using both an anterior and a posterior palatal bar.

It may be argued that some increase in section is necessary where many teeth are being replaced and when free-end saddles are present. Doubts can be expressed, however, as to whether the stress placed on the denture is any greater in these circumstances, as the amount of masticatory force is limited by the pain threshold of the mucosa under compression.

The lingual bar presents a somewhat more difficult problem in an attempt to analyse the stresses applied to it. Both torsional and bending stresses are set up due to the lateral curvature of the occlusal surfaces of the teeth (Curve of Monson), (Lesley, 1955). As a starting-point, I would suggest that a lingual or buccal bar should be as rigid as a palatal bar to forces trying to increase or decrease the curvature of the structure. It should be noted that the greatest resistance to torsional stresses is achieved with a round section as distinct from a flat plate of metal.

Table IV gives the moment of inertia of three lingual bars and a comparison of their rigidity. The first is that from the Ney waxing die, upon which the survey revealed the comments in *Table I*.

From these figures, it would appear that the lingual bars described show similar rigidity to the Ney posterior palatal bar in yellow gold.

Frequently, patients are not convinced of the necessity for wearing a Kennedy Class I denture (Anderson and Lammie, 1952), which replaces only three or four teeth. If the denture is at all bulky, then the patient is often reluctant to wear it. The advantages of using a chrome-cobalt alloy in such cases are considerable, as a connector of moderate dimensions will display sufficient rigidity.

A lingual plate of metal cannot be compared directly with a broad palatal bar, or with a lingual bar. That portion of the plate covering the lingual surfaces of the anterior teeth is corrugated and possesses greater rigidity than a flat sheet of metal of the same thickness. In the harder chrome-cobalt alloys, gauge 7 (0·020 in.) is quite rigid.

SUMMARY

It is suggested that rigidity rather than strength is the more essential property in connecting bars of skeleton dentures. Dimensions are given for palatal bars and a comparison is made of lingual bars in different alloys.

The dimensions of palatal bars suggested in this paper have been based upon those of the "Ney" waxing die patterns for yellow-gold castings.

Acknowledgements.—I wish to acknowledge the assistance given by Mr. A. Gibb, Lecturer in Civil Engineering of this University, in analysing the structural problems involved. I would also thank those members of university prosthetic staffs who assisted in the survey.

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Electromyographic Studies of Mandibular Muscles in Basic Jaw Movements

A report is made on studies using an eight-channel electromyograph, on temporal, lateral pterygoid, and suprahyoid muscles. By an arithmetical summation for periods of 0·2 sec. an attempt is made to show total muscular activity for a given movement. No information is given that would amplify the accepted conception of the role of the muscles studied.—HICKEY, J. C., STACY, R. W., and RINEAR, L. L. (1957), *J. prosth. Dent.*, **7**, 565.

ANALYSIS OF ONE HUNDRED CASES OF DRY SOCKET

By **T. LEHNER**, B.D.S. (Lond.), L.D.S. R.C.S. (Eng.)
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THE term "dry socket" is often used to describe such conditions as necrotic socket, painful socket, and localized osteomyelitis, and is associated with faulty healing and pain in varying degrees of severity following the extraction of one or more teeth. Whatever term is employed the clinical picture is clear and there can be no doubt that this condition is a great problem in dental surgery.

In this paper an assessment has been attempted of a series of cases attending the National Dental Hospital with this complication. The plan adopted has been to observe the cases, 100 in all, which have presented during a period of 8 months, and to note all relevant data which include:—

1. Incidence of dry sockets;
2. Age and sex of patient;
3. Reasons for extractions;
4. Effect of anæsthesia;
5. Clinical features;
6. X-ray examination;
7. Treatment.

ANALYSIS

1. Incidence of Dry Sockets.—During the 8 months under review 4310 teeth were extracted, of which 2040 were removed with local anæsthesia and 2270 under general anæsthesia. 100 cases of dry sockets were recorded and the total incidence is therefore 2·3 per cent. It is as well to point out that the extractions were performed by several operators (including students) and consequently the personal factor introduces a variable.

Table I gives the specific teeth extracted with local anæsthesia together with percentage figures for each tooth developing a dry socket.

Table II shows similarly the data for teeth extracted under general anæsthesia, mostly nitrous oxide and oxygen.

2. Age and Sex of Patient.—The patients in this series have been divided arbitrarily into four age groups:—

	Cases
Up to 18 years	0
18–25 years	39
25–45 years	47
45–and over	14

It will be observed that up to the age of 18 years no cases of dry socket were noted. In the 18–25 age group the incidence is high, for it is the normal eruption time of the third molars. It would be well to point out that the more difficult impacted teeth were not included in this survey as the removal of most of these teeth is not undertaken on out-patients in the dental chair. It is possible that otherwise the incidence of dry sockets might have been higher.

Of the 100 cases under review, there were 47 males, 27 married and 26 single females.

3. Reasons for Extractions.—The teeth whose removal precipitated the dry sockets were extracted in about 50 cases because of caries with acute or chronic pulpitis. Of the remaining cases some had parodontal disease while others had pericoronitis involving wisdom teeth. Unfortunately, the incidence of periapical infection or of non-vital teeth could not be ascertained.

4. Effect of Anæsthesia.—Of the 3660 permanent teeth extracted, 3·1 per cent developed dry sockets under local anæsthesia and 2·2 per cent under general anæsthesia. The following figures show the relative percentages of dry sockets developing after extraction of teeth in the upper and lower jaws:—

		Per cent
Local anæsthesia:—	Upper teeth	2·1
	Lower teeth	4·2
General anæsthesia:—	Upper teeth	1·1
	Lower teeth	3·5

From these figures it appears that dry sockets related to the upper teeth and using infiltration local anæsthesia occurred almost twice as frequently as when general anæsthesia was used. On the other hand, in the mandible

teeth removed under "block" anæsthesia gave rise to dry sockets only one-fifth more frequently than with general anæsthesia.

5. Clinical Features.—In all the cases pain was a constant feature. It was often continuous, keeping the patient awake, and when lower molars were involved, frequently radiating to the ear. Fœtid taste was a constant feature; soft tissue swelling was recorded in 18 patients, and trismus in 3 patients. In a few patients the submandibular lymph-glands were palpable and a slight rise in temperature detected. Two patients contracted Vincent's gingivitis subsequent to the extractions. Many patients were worn out and had loss of appetite. It is also interesting to note that a considerable number of patients had been taking proprietary analgesics with apparently little or no relief.

Inspection of the sockets showed three types:—

1. Sockets that lacked a normal physiological blood-clot, i.e., those that were partly filled with infected blood-clot, unhealthy granulation tissue, and pus.

2. Sockets that showed a total absence of any blood-clot.

3. Painful sockets with gum healed over the socket orifice but which were necrotic underneath.

Table I.—Teeth Extracted under Local Anæsthesia

Upper Permanent Teeth

Teeth	No. of Teeth Extracted	No. of Dry Sockets	Percentage
Incisors	102	1	1
Canines	79	0	0
1st Premolars	139	3	2·1
2nd Premolars	137	5	3·6
1st Molars	223	6	2·7
2nd Molars	100	1	1
3rd Molars	228	5	2·2

Lower Permanent Teeth

Teeth	No. of Teeth Extracted	No. of Dry Sockets	Percentage
Incisors	89	0	0
Canines	57	0	0
1st Premolars	98	3	3
2nd Premolars	158	3	1·9
1st Molars	246	15	6·1
2nd Molars	99	3	3
3rd Molars	261	18	6·9

24 Deciduous teeth extracted without developing dry sockets.

Table II.—Teeth Extracted under General Anæsthesia

Upper Permanent Teeth

Teeth	No. of Teeth Extracted	No. of Dry Sockets	Percentage
Incisors	175	0	0
Canines	85	1	1·2
1st Premolars	144	1	0·7
2nd Premolars	110	4	3·6
1st Molars	161	1	0·6
2nd Molars	78	0	0
3rd Molars	127	3	2·4

Lower Permanent Teeth

Teeth	No. of Teeth Extracted	No. of Dry Sockets	Percentage
Incisors	89	0	0
Canines	46	0	0
1st Premolars	92	0	0
2nd Premolars	82	1	1·2
1st Molars	223	12	5·4
2nd Molars	69	2	2·8
3rd Molars	163	12	7·3

626 Deciduous teeth extracted without developing dry sockets.

6. X-ray Examination.—About 60 per cent of all cases had had an X-ray examination, some pre-extraction and others post-extraction, the percentage of each being rather small. The following points seem worthy of note:—

1. Twenty cases showed a thickened lamina dura or sclerosis of the surrounding bone before extraction.

2. Seven cases had a number of small sequestra in the socket. These were visible, on the average, 21 days after extraction, and the age incidence of these cases was high, viz., 44 years.

3. Thirty-one cases showed no unusual features.

4. Two cases showed on the post-extraction radiographs the more diffuse type of bone destruction usually associated with osteomyelitis.

7. Treatment.—All patients had undergone the routine of having the dry socket syringed with a warm saline or Dakin's solution. The choice between different dressings is largely a matter of personal preference. BIPP had been used with adequate results, but the benzocaine preparations (i.e., benzocaine, iodoform, and zinc oxide mixture) seemed less effective. Sequestrectomies or curettage were performed in cases which had been treated earlier by irrigation and dressings. In severe cases "socket decorticectomy" had been performed with almost immediate alleviation of pain.

AETIOLOGY

From the foregoing analysis it is suggested that a dry socket is caused primarily by a local deficiency in blood-supply, and the evidence for this is based on the following facts:—

1. Dry sockets have not occurred in any of the patients under the age of 18 years. During that age period bone is more vascular and less dense than in later life.

2. The condition is more frequent in the lower jaw where bone is denser than in the maxilla, and the blood-supply more vulnerable to occlusion.

3. The molar region in the mandible is most commonly affected, accounting for 77 per cent of the cases. It would appear that more compressive force is often necessary in the removal of these teeth and this may lead to depletion of blood.

4. A considerable number of cases which had pre-extraction radiographs showed evidence of thickened lamina dura around the roots and therefore a defective blood-supply.

5. The local anæsthetic employed (xylocaine) in all cases of local anæsthesia contained adrenaline. If infiltration anæsthesia is employed the incidence of dry sockets is almost twice as frequent an occurrence compared with extraction under general anæsthesia. In "block" anæsthesia, however, the incidence of dry sockets is only one-fifth more frequent than is the case with general anæsthesia. It is therefore likely that a local ischæmia is readily produced by the injection of a local anæsthetic containing a vaso-constrictor, temporarily raising the tissue fluid pressure and reducing the blood-supply.

The following theories are commonly advanced to explain dry socket, but in the light of the above observations do not appear of primary importance.

1. Infection is often cited as the cause of dry socket but this condition is not especially related to neglected oral hygiene. Chudzinsky has also shown, from a study of the incidence of dry sockets following the removal of impacted third molars, that there did not appear to be any significant difference in incidence when either strict aseptic surgical technique practised in operating theatres or the usual "surgically clean" method (i.e., common dental practice cleanliness) were employed in the removal of these teeth.

2. Washing out of blood-clot in the socket by early rinsing immediately after tooth removal has been stressed as an important factor. There is no reason, however, why all sockets in multiple extractions should not be equally affected.

3. General or systemic conditions are not likely to account for the complication because the patient may have several teeth removed and only one socket be affected. Also, dry socket develops in the healthy, and Gardner excluded general health as a factor in his study of dry sockets.

There are, however, many factors which may aggravate or be superimposed upon the original pathological state caused by the local deficiency of blood-supply, such as infection, prolonged manipulation, and leaving sharp spicules of bone.

PATHOLOGY

To give a full pathological picture is impossible as no histological study has been undertaken. However, from the clinical manifestations, X-ray study, previous work of investigators, and applying principles derived from the field of general orthopædics,

it is suggested that localized avascular necrosis is the underlying pathology in dry sockets.

This term denotes the death of bone due to mechanical injury. It is conceivable that during an extraction, where often extreme forces such as pressure and traction are applied, the bone with its thin-walled vessels cannot sustain concussion from violent shaking so that there is a local interference with the blood-flow. Alternatively, small incomplete fractures of alveolar bone may be so deprived of blood that they die. Bone of jaws has very little collateral circulation and therefore the bone immediately surrounding the socket is cut off from its normal blood-supply.

Hence, although a blood-clot may be present it will not undergo organization as there is no vascular tissue to bring in the essential cellular and humoral elements. Consequently, the blood-clot would appear to undergo three possible changes which are certainly observed clinically.

1. As granulation tissue does not invade the blood-clot, the latter disintegrates and is eventually washed out by saliva. Hence the clinically observable empty socket.

2. The blood-clot may become secondarily infected since the dead unorganized blood is an ideal medium for bacteria to flourish. The resulting socket appears clinically as an unhealthy infected blood-clot.

3. As organization occurs most rapidly in the upper third of the socket the blood-clot deep in the socket though unorganized will be covered by a normal looking clot or gum, and still be painful.

In many cases revascularization of blood-depleted bone occurs, though in a few cases necrosis takes place. The necrosed bone is exfoliated, and the sequestra either work themselves out through the socket or have to be removed surgically. Once the dead part of bone is eliminated or in the less severe cases becomes revascularized, the socket will proceed with normal healing.

Avascular necrosis probably takes place in the majority of dry sockets, but rarely a true localized osteitis or osteomyelitis may supervene caused by infection through virulent bacteria.

PREVENTION

Armstrong postulated that dry sockets exist potentially before the teeth are extracted, but are manifested only after extraction takes place. This concept seems sound in the light of the theory of avascular necrosis.

If it is suspected from an X ray that the vascular supply of bone surrounding the tooth to be extracted is or will be depleted by manipulation during extraction the following measures should as far as possible be adhered to:—

1. Local anæsthesia should be avoided, but, if it is indicated, block anæsthesia is preferable.

2. Thin inter-radicular processes are best nibbled off immediately after extraction.

3. Denuded alveolar bone should not be left exposed.

4. If the occurrence of dry socket is almost certain, an analgesic and antiseptic dressing is inserted at once, or further surgical measures undertaken as described below.

TREATMENT

If in spite of all the precautions a dry socket is not averted, then two procedures appear to be at the operator's disposal.

1. The socket may be irrigated at frequent intervals with warm saline solution and dressed with one of the proprietary preparations (e.g., BIPP) leaving nature to cope with the situation, and if necessary assisting it by removing any sequestra.

2. Anticipating a severe and prolonged course, surgical measures appear to be justifiable and here the term "socket decorticectomy" may be coined. The socket is syringed out and the walls of the socket are carefully felt with a probe at different points and if there is any part that does not bleed it should be noted. A layer of bone is removed preferably under general anæsthesia with a small chisel or bur until ample blood-supply is encountered. After debris has been washed out with warm saline, the socket should be allowed to fill with blood. The operation should be performed preferably under a cover of systemic penicillin. The above method may sound heroic but considering that some patients have acute pain and discomfort

lasting several weeks or even months, the procedure has proved satisfactory.

SUMMARY

1. An attempt has been made to analyse 100 cases of dry socket.

2. The primary aetiological factor in dry sockets is believed to be a deficient local blood-supply and subsequent ischæmia developed by the extraction trauma.

3. Avascular necrosis may well account for the pathology of dry sockets, but further investigation is needed.

4. Several methods of treatment of dry socket are described.

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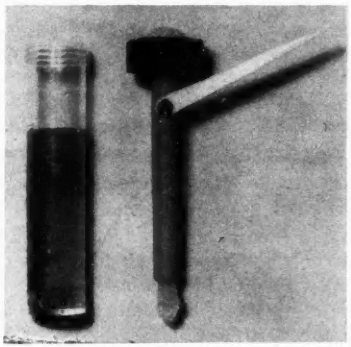
LETTER TO THE EDITOR

April 20, 1958

Dear Sir,

I greatly enjoyed reading Mr. S. Cripps' excellent article about "Practical Periodontics" in your issue of March, 1958 (Vol. VIII, No. 7, page 215). He is only too right in his statement that the most gratifying results of our treatment are of no permanency if we fail to secure the patient's future co-operation. The psychological approach in the briefing of the patient in the correct use of toothbrush, wooden sticks, etc., is therefore as important as our dental treatment.



For the last three years or so I have recommended the use of two very effective devices—not mentioned by Mr. Cripps, but apparently well received by the patients. They are two supplementary small toothbrushes (*see illustration*). I found that many patients who were reluctant to use the wooden sticks regularly accepted readily the suggestion to clean and rub the interstitial areas and the marginal gums with these little brushes; and most important, more patients seem to persevere with this kind of self-treatment than with the sticks.

The two small brushes are complementary to each other. One is called "Oroclean" or "Companion Toothbrush" and consists of a plastic container the size of a lipstick container holding a combined set of a small nylon toothbrush and a plastic toothpick. The handle of the brush is fixed to the lid of the container and is therefore ready for use when opened. The toothpick is hinged to the handle and can be turned away from it. Thus both can be used without interfering with each other. The container is watertight and is to be kept filled with fresh water which should be renewed once or twice a day. A drop of antiseptic mouthwash can be added to flavour it and keep it pleasant. It is not necessary to rinse the mouth after using this brush.

The brush itself is shaped as one rather large tuft and its bristles are bevelled towards the periphery; thus the brush is easily pushed into the interstitial spaces, at the same time scouring the approximal surfaces of the teeth. The brushing of the marginal gums and necks of the teeth is equally easy.

The other brush consists of a similar large tuft fixed to a long contra-angled handle, again carrying a hinged plastic toothpick. This brush is very handy to rub and scour the more inaccessible areas of the lingual or palatal areas of the teeth. It is, I believe, the only means to clean the distal surfaces of molars and the marginal areas of heavily lingually tilted teeth.

My advice to patients is to use the contra-angled brush at home and always to carry with them the small straight one to be used after each meal when eating out. The little container is easily carried in a handbag or waistcoat pocket and is no encumbrance at all. I have used both brushes myself and have recommended them to many patients and found that their use checks both the tendency to decay and the progress of periodontal disease.

Yours faithfully,

H. G. ORLAY.

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*London, N.W.*6.

PRACTICAL PERIODONTITIS TREATMENT EASILY APPLIED BY THE GENERAL PRACTITIONER*

By **L. M. WIESSTIEN**, D.D.S., *Cleveland*

In a consideration of the dental problems confronting the general practitioner, periodontics play a major role in both the reconstructive and preventive phases. These problems of preventive and curative periodontics are not insurmountable and can be successfully combated by the general practitioner. To-day the widened scope of modern dentistry presupposes a concern not only with restoration of lost tooth structure, but also with the preservation of the supporting tissues of the teeth and the oral mucosa in both health and disease.

For a hundred years there has been a confusion of periodontal techniques; however, just recently we feel that we have been privileged to learn and to apply the technique of débridement of root surfaces as a most important aid for obtaining consistently successful results. In our opinion, if properly applied, the general practitioner can share with us the satisfaction in seeing really good results in 85–90 per cent of their cases, if they choose to carry through on the conservative techniques, as outlined and emphasized in this paper. We realize the difficulty which we experience with the last 10 per cent of the really complicated periodontal cases, but we feel that a great step forward has been made in caring for them. Periodontal disease is curable provided the tissue destruction has not gone too far, e.g., trifurcation involvement of upper molars.

To-day we are successfully treating advanced cases which we formerly considered hopeless. Much of the problem of treating it is concerned with eliminating the conditions tending to destroy the supporting structures, and then restoring it to health and maintaining it so.

The part played by the dentist in the treatment of periodontal disease is the removal of a sufficient number of the causative factors, thus getting the mouth into a condition wherein the patient can care for it properly. The part played by the patient consists in diligent, wholehearted co-operation in carrying out the instructions of the dentist in matters of home care and toothbrush techniques, as well as complying with recommendations for reconstruction, as the diagnosis of the case may dictate.

It is essential for the maintenance of dental health that the carefully outlined and prescribed measures be continued and that the patient submit to a prophylaxis or "preventive treatment" at prescribed intervals. Failure to do so may bring about a recurrence of the same condition which produced the disease originally. We must not confuse prophylaxis, properly done, including tooth neck débridement, with "having the teeth cleaned". The former is a valuable service, the latter usually useless in the prevention of dental disease.

PREVALENCE OF PERIODONTAL DISEASE

Marshall Day in a recent report says: "Investigation in the teaching of dental schools shows that periodontics has been, without doubt, that branch of the art and science of dentistry most inadequately taught and most frequently neglected in oral health service." In adult life many more teeth are lost because of periodontal disease than by tooth decay. In a recent study at Tuft's College they found that from age 35 years upward, bone loss was almost universal, ranging from 98 to 100 per cent of all people. It is no wonder then that 65 per cent of all people over 35 years of age who lose their teeth lose them because of periodontal disease. We find people that feel disgraced

* A paper delivered to the American Dental Society of Europe, July 10, 1956.

when they learn that they have so-called "pyorrhœa alveolaris". This should not be so, since it is not always the result of neglect or uncleanliness, but rather of living habits common to us all, plus a lack of complete knowledge concerning its causes and prevention. I am glad to say that we are constantly acquiring more "know how" regarding its causes and can now do more about removing them. With the realization of the extension of this disease process, you can readily understand our keen desire to interest the general practitioner in the early recognition of periodontal breakdown and try to show him what he can do to correct it.

Since we can better judge the need and the degree of progress in our work if we have a good record of the conditions that existed at the start, it is our belief that a successful and efficient treatment system can hardly be accomplished without a detailed practical charting of the disease extent and factors pertinent to it.

CHARTING OF MOUTH

We list in our charting of the mouth such factors as pocket depth, loss of contacts, overhanging margins, gum recessions, and overmobility of teeth. We tabulate for the referring dentist what we will do, as well as what he is to do in the way of oral reconstruction, commensurate with conservation of the remaining teeth. We include inquiry into the general health of the patient, such as history of rheumatic fever, diabetic status, and dietary habits. Experience has taught us that many systemic diseases may manifest themselves in the form of an oral lesion. We like to note in the mouths of our patients the lips and corner of the mouth, the tongue, as well as mucous membrane and teeth. Vitamin deficiencies have a way of showing up in the form of mouth lesions. An example of the latter which we probably see more frequently is our acute necrotizing, ulcerative gingivitis, or so-called "trench mouth". Since every general practitioner may run into these cases I think it behoves us to digress here for a few moments to clarify some changing thought regarding its aetiology. For years we have considered it highly communicable and we were most careful in warning patients against transmitting it by contact. This myth of communicability has been disproved because of the failure of the disease to fulfil Koch's postulate. A report by the American Dental Association Research Commission has indicated that this form of periodontal disease is probably not communicable.

Rosebury states that necrotizing gingivitis should be regarded as being infective, transmissible under limited conditions, and apparently not communicable. Schwartzman and Grossman's study disproved the communicability of the disease. Spies has shown us mouths of patients with pellagra, a nutritional deficiency disease, that displayed the same clinical evidence as we find in our acute necrotizing gingivitis. More recently, Glickman has expounded in length on the interrelationship between nutritional deficiency diseases and periodontal breakdown. He said that in every case there is some form of local irritation that prompts the initial change and also admits that there are no nutritional deficiencies which of themselves cause chronic inflammation of the gingiva. He stressed the need for prescribing natural foods with a maximum detergent effect on the gingiva.

INCIPIENT BREAKDOWN

Continuing now with the recording of our patient's mouth, we feel that it is the responsibility of the individual dentist to record and remove incipient signs of periodontal breakdown, since he is the one that sees many of the patients with regularity. He should carefully note the presence and results of traumatogenic occlusion, calculary deposits, poor oral hygiene, and gingival irritants, and should always be aware of potentialities of an inadequate diet and systemic disease, as previously stated. They all may be contributing toward the oral picture. We should become acquainted with the various clinical manifestations of incipient breakdown, for they are indications of tissue loss and subsequent pocket development. Included amongst the early signs of periodontal disease (Box, 1924), besides the more usual

inflammatory gingival margins, are over-mobility, festoons, lack of stippling, and Stillman's clefts.

Radiographs play a very important part in our diagnosis. I would not think of arriving at definite conclusions based on a digital examination alone any more than I would upon a radiographic examination. A careful study of our radiographs discloses the type of pockets as well as the amount of bone loss. It enables us to classify the case into the complex type, with its V-shaped destruction of bone, the so-called "intra bony pocket", and which is often indicative of occlusal trauma; or the simplex type, with its typical horizontal destructions. This latter type is often due to lack of oral hygiene, loss of contact points and overhanging margins of crowns and fillings, and has been accordingly named by Gottlieb as "Schmutz pyorrhœa". X-ray evidence of marked horizontal destructions is also associated with dystrophic conditions, and when found in well kept mouths, in the absence of any of the preceding conditions, justifies our suspicion of a possible systemic factor, namely a dietary one.

TREATMENT OUTLINE

Step I.—After a complete charting of the mouth and with radiographs and accurate study casts mounted in existing relationship on hand, our next appointment includes our first step in our technique and we figure that this will take from 1 to 2 hours. We start with a removal of supra-gingival calculus, as well as gross ledges and debris catchers. Then we concentrate on crevice sanitation by using antiformin before the removal of gross sub-gingival calculus (Johnson and Waerhaug, 1956; Box, 1953). Knowing of the medical man's version of the possibility of inducing a bacterial endocarditis by stirring up inflammatory areas by manipulation, in certain types of patients, has in the past deterred us from advocating too much massage until the inflammation had been reduced. Merck's Index in the U.S. Pharmacopœia tells us, among other potential capacities, that antiformin has strong germicidal properties and is known to liquefy many an organism and it is this assurance that permits us to attempt the removal of subgingival calculus at the first sitting. Included in this first step is tooth-brush selection with detailed instruction in its proper application.

Tooth-brush Technique.—Let us digress here to explain our version of the proper application of the tooth-brush. For twenty years or more we had used and advocated an extra-hard natural bristle brush applied with a modified Charter technique. This we taught with a two-step procedure that embraced both tissue stimulation as well as tooth cleansing. However, since the second world war we have not been able to get any good natural bristles, the best having previously come from the Russian and Chinese boar. Since nylon was the material of choice for the bristles of our modern brushes, it behoved us to see that our patients received a texture of brushes that would be kind to the tissue. At all times we should scan the tissues to be brushed and their problems; this in turn dictates the shape and bristle rigidity of our brush. We use a brush with the bristles cut alternately high–low and they come in textures of 0·008, 0·009, 0·010. We stress a sweeping action of our brush around the tuberosities of the upper left and right arch, areas that are too often neglected in many mouths. We try to show them the fallacy of opening the mouth too wide, which brings the coronoid process of the mandible down alongside the upper molars and thus prevents the brush from reaching these parts. We then direct the use of the brush in an up-and-down movement, including gum line in upper to gum line in lower arch. In this manner it cleans debris from near the gingivæ as well as between the teeth. It likewise tends to promote better circulation in the soft tissues as well as develop a tougher and more keratinized epithelium. After 3–4 weeks we add circular brushing to our technique, reaching the alveolar mucosa and the teeth with a $\frac{3}{4}$-in. circular stroke. At the start, in our periodontitis cases, we request that they employ the brushing system at bedtime and following each meal. When healthy tissues are in evidence, twice-daily brushing is usually sufficient. The tonus of tissues is a fine

indicator of the pressure one should use in applying the brush. At no time should the tooth-brush be used in a manner that will abrade or lacerate the soft tissue. [The tooth-brush technique was demonstrated by showing a short cinematograph film.—Ed.] We like to get our impression of proper mouth care over to our patient early in our treatment; in that way we can better judge whether or not we have a co-operative patient. Without full co-operation we cannot get our desired results, for the patient can undo, through indifference or negligence, most efforts on our part to help. The patient must know that the proper care of the mouth is to be a daily ritual for all time. Should the patient complain of any pain at this first appointment we always try to arrive at the cause and relieve it. This first step in our treatment system may be done at either one or two sittings, but should be accomplished as soon as possible.

Step II.—When the patient returns in about three weeks, it should be an entirely different mouth condition that confronts us. If the patient has been co-operative and has followed the instructions given for home care, the mouth should disclose a marked improvement in tissue tone, as well as a freedom from stagnation and accumulation around the necks of the teeth. We look for weakness in the technique, such as where we may find a soft mucoid pabulum, materia alba, around the tooth neck, showing that the brush was not getting to the gum line. An attempt is always made to review with the patient, at this sitting, brushing instructions previously given and to try to eradicate any flaws in technique that may have crept in.

We can now proceed to reduce gross occlusal overload. I am referring only to those cases with marked evidence of tissue impingement in centric or primary contacts or a tripping effect in an excursive movement. No attempt is made to do a fine occlusal balancing now.

Our attention is now directed to débridement of the necks of the teeth. This term we have applied to the removal of the deteriorated tooth neck and root surfaces, as mainly described by Dr. A. B. Riffle, of Rochester, New York. Our clinical findings have shown us that this comparatively new revealing procedure points directly to the fact that these deteriorations initiate and aggravate periodontium breakdown. It subsequently prevents periodontium reattachment, if our treatment fails to include their thorough removal.

Antiformin, carefully applied, is first used in crevices of the teeth to be worked upon. These are areas that show softened enamel and shallower crevices. We use Whiteside No. 2 scalers and Gracey curettes, always kept sharp, for débridement purposes. By this procedure we find we can often avoid having to insert fillings in many cervical areas by the removal of the soft degenerated tooth structure, then smoothing over the enamel edge. In fact every tooth that is to be subject to full coverage should have this débridement of the neck before the work is done, if we wish to avoid some of the pitfalls of past experiences, namely, increased root degeneration occurring beyond margins of castings, with increased gingival inflammation.

In this Step II of our outline we should also plan the restorations that are indicated for this particular case. These would include replacement of missing teeth, eliminating of food packs, restoring contacts, splints when necessary, and restoration of function to masticatory organs.

Step III.—We now come to Step III in our outline treatment plan. This is generally arranged for 3–6 weeks following the last sitting in Step II. By this time the mouth should present good tissue tone, free from stagnations and with the gum tissue hugging the necks of the teeth. We must now think in terms of completing our occlusal balance. Our objective should always be a distribution of occlusal stresses, as evenly as possible, over as many teeth as possible, in a manner physiologically acceptable to the periodontium. In this way we prevent periodontal disease and favour its healing. We know that the greater the angle of the inclined cusps, the greater is the torque-producing factor. Therefore, as indicated by our radiographs, showing oblique bone loss as well as the amount of

bone loss, are we guided in how much we reduce these angles. We always strive to direct stresses as much as possible in the general direction of the long axis of the tooth, for nature has given us connective tissue fibres that will be best maintained by stresses in this direction.

We continue with our débridement of root surfaces, the amount varying with number of and depth of existing pockets. A factor with which we must contend in débridement procedures is sensitivity of teeth. We all know how relative the term "pain" can be and how differently people will react to similar impulses. We are inclined to classify our patients who must submit to this procedure as No. 1 non-sensitive tooth dentine, No. 2 medium sensitive tooth dentine, No. 3 hypersensitive tooth dentine. In class No. 1 débridement of all teeth can be accomplished in a short time. In class No. 2 débridement proceeds more slowly—doing only 3–4 teeth at a time (usually employed desensitizers). In class No. 3 débridement proceeds slowly—may take two years to complete. In this case we do only one or two dentine areas at a time. Bi-weekly application of 2 per cent fluorine paste helps and we make longer intervals between treatments.

In the meanwhile, attention should be focused on completion of recommendations for restorations, on extractions, on food pack eliminations, and upon placement of splintations where indicated and necessary.

Step IV.—Step IV in our treatment planning takes on a different aspect with different individuals. Our débridement should be completed or its completion planned. This depends on the complexities of each case. Similarly, variations in dentine sensitivity, crevice depth, and number of areas involved all embrace variabilities in different individuals. Therefore, one cannot be too dogmatic in laying down a definite procedure. The future interval of prophylaxis treatments must be determined and arranged. Here again the personal equation must be considered. Many people will accumulate as much tartar in a two-month period as the next one in six months, depending on variations in the chemistry of the saliva as well as on the cleansing effect as practised by the patient.

EFFECT OF TOOTH LOSS

In the treatment of periodontal disease, nothing is more detrimental to a favourable diagnosis than tooth loss. It usually creates an unfavourable prognosis in proportion to the number of missing teeth. We are all acquainted with the mutilation of mouths that occur because of non-replacement of missing teeth resulting in drift and tilt of the adjacent teeth and extrusion of the tooth in the opposing jaw.

One of our greatest problems in periodontia is how to correct this situation so that we may restore masticating efficiency and occlusal balance without, at the same time, injuring the remaining teeth. The fixed bridge is the restoration of choice. Teeth that display overmobility, resulting from a traumatogenic occlusal overstress, as well as a corresponding loss of alveolar bone, can be splinted together and thus we can compensate for previous loss of supporting structures. In all cases, as much consideration should be given to the conservation of the remaining teeth as is given to the restoration of the missing teeth.

CO-OPERATION OF PATIENT

Aside from all that we can do for our patients in the dental chair, much of our success in periodontics hinges on the co-operation of the patient. I have mentioned this before, but I do feel very keenly the importance of this factor, so I think it bears repetition. Very early in our treatment we should be able to determine whether or not we have this full co-operation. Time should be spent in convincing the patients that all we can do is to remove causes and get the mouth into a condition wherein they can care for it. The daily care is up to them. We must stress the fact that by the proper application of the tooth-brush and by careful interdental stimulation they can often reduce existing pocket depth by several millimetres. An exception to this might be in the class of full, heavy gum tissue type, often surrounding short teeth and with pockets not too deep. Here, little good is

attained by tissue stimulation and surgery is indicated from the start.

MEDICAL CONNOTATIONS

May I touch briefly on the intimate relationship of the mouth to the entire body? I choose to look upon the mouth as one of the finest indicators of one's general health. We should train ourselves, in looking into a mouth, to observe any deviation from normal in the mucous membrane, the tongue, and the lips. It would be well to remember that these oral tissues come under the same physiological laws and that its pathologic pictures are similar to those in other parts of the body. The relationship between the dental tissues and the body are reversible; the periodontal tissues may be causative of systemic disturbances when acting as a foci of infection, and also in the other direction, many systemic diseases, if carefully observed, may show some manifestation in the mouth.

Removal of systemic causative factors are still the weakest link in our chain of treatment. There are far more local causative factors that we must overcome and correct. Our outline, as given above, deals mostly with the removal of local factors and has proven successful in such a large proportion of our cases. We try to impress upon our patients that the toothbrush is not a panacea for all our mouth ills; that we are more interested in the kind of brush used and how they use it, rather than in the dentrifice.

In my humble opinion, I would not be willing to trade one of my own teeth for the best replacement that dentistry could give me; and I know what good dentistry can be inserted to-day. There is a big difference in the feeling of solidness when teeth invested in the alveolar process of both jaws come together versus that attained when the teeth are resting on a saddle area. May we now resolve, as dental practitioners, that we will do all in our power to save the natural teeth in the arch. As long as there is sufficient bone support to the tooth and with good endodontic treatment which is now available, together with the splintation of already weakened teeth, we can save many teeth that formerly would have been extracted.

SUMMARY AND CONCLUSION

An attempt has been made to outline the importance of periodontics and to make the general practitioner aware of his important role in preventing and correcting periodontal breakdown. We have presented an outline of treatment of periodontitis, emphasizing the removal of the deteriorated tooth neck and root surfaces. When such surfaces are thoroughly removed and an efficient toothbrushing system instituted we obtain results far surpassing any previous method used.

In conclusion, my desire in bringing to your attention factors which we have found greatly instrumental in saving teeth has been to stir the thinking and emotions of you, my fellow practitioners, to the end that we may all participate in a better contribution to our profession.

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Pain Control in Dentistry for Children

The use of nitrous oxide analgesia for routine children's dentistry is described. The results of 14,632 administrations on 1873 children between the ages of 2–16 years are reported. The author claims that the administration is pleasant for the patient; operative procedures can be carried out quickly in any part of the mouth; analgesia is effective in the emotionally unstable child; it is safe, and recovery is swift and uneventful.—Fechtner, J. L. (1957), *J. Dent. Child.*, **24**, 163.

DENTAL HEALTH EDUCATION IN ITALY, SWITZERLAND, AND GERMANY*

By D. H. GOOSE, L.D.S. R.C.S. (Eng.), B.D.S. (Univ. Birm.)

I SHOULD like to take this opportunity of recording my thanks to the Scholarship Committee of the British Society of Periodontology and to the Directors of Messrs. D. & W. Gibbs for their kindness in sending me on this trip to the Continent. It is very easy to become parochial and the opportunity of seeing what other countries are doing gives a great stimulus to one's thought and work.

It is difficult to summarize everything I saw, particularly as the basic systems of dental care in the countries visited differ both from each other and from ours. Two points in particular may serve to illustrate this: First, the ratio of dentists to population; in Germany it is 1–1500 approximately[1] compared with our own of 1–3273;[2] in the Zürich School Dental Service in 1954, there were 21 Dental Officers for a school population of approximately 39,000 (the number of Dental Officers has increased substantially since then, with only a moderate increase in the number of children), whereas in my own county Northamptonshire, which has about the same school population, there are only 6 Dental Officers.

Secondly, it is well known that the general public in the countries visited is more conscious of the need for dental health than in Great Britain. For example, Müller[3] states: "The Germans dislike the idea of teeth being extracted. . . ." In Zürich I found that if it was desired to extract four first permanent molars to relieve overcrowding, the School Dental Service used a special form to explain this to parents. This form was very well illustrated to show how improvement could be brought about both in the position of the teeth and also in the reduction of decay. The inference is, of course, that it is fairly difficult to persuade Swiss parents to allow their children's permanent teeth to be extracted—a difficulty not so noticeable, I fear, in Britain.

I should like briefly to mention the route taken and the people encountered. First stop was at Rome for the Twelfth International Dental Congress, then on to Vienna, to meet Dr. Brenner, the Vice-President of the Austrian Dental Board; from here to Zürich to meet Dr. Freihofer, President of the Public Dental Health Services Commission of the F.D.I., Professor Hotz, Director of the Orthodontic and Children's Department of the Dental Institute of the University, and Dr. Reiser, the Chief Dental Officer of the School Dental Service; next to Geneva to meet Dr. Sibelius, the Dental Officer to the World Health Organization, who was formerly Director of the Public Dental Service in the state of Tennessee, U.S.A. In addition here, I was able to see the Chief of the School Dental Service, Dr. Piguet, and found his work on the administration of fluoride tablets to schoolchildren very interesting. My next call was at Basle to see Dr. Gutherz, who had organized the Swiss part of the Dental Health Exhibition in Rome and is head of the School Dental Service.

The last part of my journey was in Germany, calling at Frankfurt to meet Dr. Tholuck, Director of the German Committee for Youth Dental Services—a remarkable man who seems to know everyone of importance in this type of work in Germany; Mr. Knaupp, Manager of the Association of Toothpaste Manufacturers, who have recently entered the field of Dental Health Education; and Dr. Niedenthal, School Dental Officer at Offenbach; at Wiesbaden to meet the Chief Medical Officer of Health for the state of Hessen; and finally, to visit Dr. Braun, who is the Secretary of the organization representing all the German Dental Associations.

ITALY

The Twelfth International Dental Congress was of record size, over 7000 attending and representing 72 different countries. It was

* Read at the meeting of the British Society of Periodontology, held on Monday, Feb. 10, 1958.

held at the E.U.R. Congress Buildings, just outside Rome, which were excellent for the purpose as there was plenty of room, and facilities existed in many of the halls for translation into five different languages (*Fig.* 1). We received much hospitality from our hosts, both on professional and social occasions. Naturally, there was an enormous amount to see and hear and I gained a lot of information on the subject of Dental Health Education by means of informal talks, but it will not be possible to give a coherent account of all these, as they represent a number of different opinions from representatives of countries other than those which I was later to visit.

Fig. 1.—The building in which the International Dental Congress was held, Rome, 1957.

I endeavoured to attend as many relevant meetings as possible, such as reviews and discussions on subjects like dental caries prevention, the aetiology of paradontal disease, and children's dentistry—all these proving extremely interesting. Another group of discussions of great value were those on the social background of dentistry in the different countries which I was to visit later as, of course, it is necessary to understand this background before seeing what measures can be taken for dental health education. For example, one point which arose here was that it is rather more difficult to introduce this education into a system largely composed of private practitioners than into one mainly based on school clinics, since the general practitioner is usually paid on a scale of fees which excludes anything for this subject.

There was a Dental Health Exhibition which was open to the general public, as well as to delegates, and a number of countries took part by means of demonstrations, literature, and films, etc. The Italian section was very well set out, but showed that there are a bewildering number of organizations involved in providing dental care in Italy, for example, the Eastman Clinic, School Dental Service, I.N.A.M. (Public Assistance), E.N.P.A.S. (for State employees), and I.N.A.I.L. (National Institute for Accidents at Work, including maxillo-facial). This mainly covers the urban areas, however, and in the rural districts treatment is difficult to obtain. With this background it can be seen that health education is not likely to thrive, although there was exhibited an amusing booklet called *Allarme* which was addressed to parents, drawing their attention to the necessity of dental care.

Before leaving Italy I must mention one of the habits the people have which must inevitably assist in oral cleanliness, and that is the eating of fruit and salads. These appear at every main meal, and without doubt their cleansing effect on teeth must be considerable.

SWITZERLAND

The World Health Organization is not primarily concerned with Europe, but in Geneva I had the advantage of meeting Dr. Sibelius, the Dental Officer, and he was able to give me some information on its activities

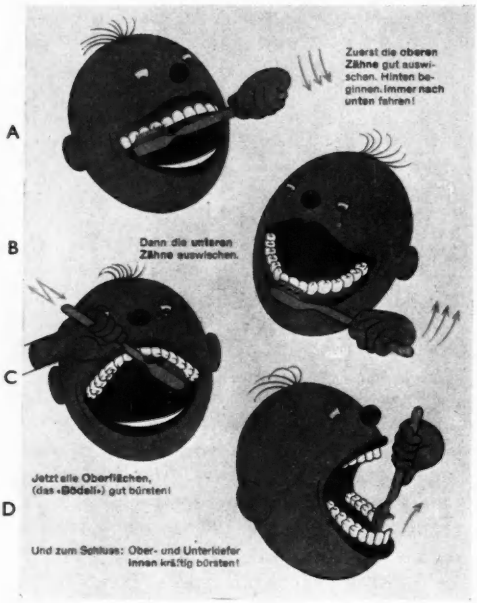

Fig. 2.—A, First, clean the upper teeth well, begin at the back. Always brush downwards. B, Then clean the lower teeth. C, After this, brush the upper surfaces well. D, And to finish carefully brush the insides of the upper and lower jaws. (In its original form this illustration appeared in black, orange, green, and white.)

concerning health education in general. The W.H.O. does not initiate campaigns of Dental Health Education but rather it advises Governments who seek its help on the most appropriate dental service to set up for their particular needs, i.e., emergency treatment is obviously the first requirement, and only later would it be reasonable to introduce health education in conjunction with dental care of the priority classes. Another way in which the W.H.O. helps is by periodically convening conferences of experts who issue reports for general publication and I saw an example of one of these that had just been issued on water fluoridation.

Switzerland itself is divided into 22 cantons which are entirely autonomous in education and health matters; also three different languages are spoken. This clearly makes a nation-wide health education programme very difficult to organize, although many of the leading dentists there are alive to the eventual necessity of this being done.

Before discussing the efforts made in dental health propaganda it may be of interest to state how the schoolchildren are cared for in Switzerland as a whole.

1. Five hundred and eighty-five private dentists are treating 190,000 children under a scale of fees method.

2. Eighty-one school dentists are treating 120,000 children in static clinics.

3. Ten school dentists are treating 10,000 children in mobile clinics in the more inaccessible areas.

4. Private practitioners are treating 80,000 children by means of private fees.

Thus 80 per cent of the school population are inspected and treated regularly,[4] this being a far higher proportion than in Great Britain where, for example, in 1954 only 40 per cent of the school children were seen[5] either in general practice or through the School Dental Service.

In most areas talks are given by the Dental Officers, to the school entrants and their parents, after which pamphlets of a suitable type are handed out (*Fig.* 2). In Zürich they have actually trained two girls to do this type of work rather on the same basis as our own Oral Hygienists, but without any clinical duties. School teachers, health visitors, etc., are provided with booklets on dental care and the children are given further leaflets appropriate to their age at about 10 or 11, and once again before they leave school; these latter also indicate how to obtain dental treatment via the social services. A special form exists in some areas that may be sent to parents, drawing their attention to the neglect of oral hygiene of their child and giving recommendations on how to improve it. Correct diet is stressed for both mothers and children, and in

Basle they had a very useful system of supplying apples cheaply to the schools so that they might be eaten by the children after their meals.

There are no schemes for fluoridation of the water supplies, but the Swiss are concentrating more in putting fluoride into other vehicles such as in salt in Zürich and other towns, in milk in Winterthur, and in tablets in Geneva. Preliminary results are only available at present in the case of tablets, and as it seems very difficult to control the intake of these vehicles it will no doubt be difficult to evaluate their efficiency.

I visited Professor Hotz's orthodontic clinic, hoping to see whether any simple public health measures for the control of malocclusion existed, but of course this has not yet proved possible as Seipel[6] has stated, "Clinical experience and continued aetiological research have shown that malocclusion cannot be prevented in a simple or uniform way". Professor Hotz has extensive records of cases over a long period and these show very well how many individual variations occur, making it impossible to suggest preventive measures but showing the necessity of weighing up all the factors concerned in making a diagnosis for a particular child. However, some prevention might be accomplished by health educative means and an example was found later in Germany, drawing attention to the evil effects of sucking habits on the occlusion (*Figs.* 3, 4).

Fig. 3.—Mother, how will your child appear later on? Like this, or

Fig. 4.—Like this. Many cases of tooth and jaw irregularities are traceable to the bad habit of thumb sucking and so if you are careful, beware.

GERMANY

Western Germany is divided into several different States which are self-governing, and this makes uniformity difficult: for example, they have no standard dental record card like the one issued by the Ministry of Education for use in the School Dental Service here. However, there is an organization dealing with children which has representatives in all the States. This was set up in 1949, its name being the Youth Dental Service, and its objectives as

stated in a booklet *Directions for a Systematic Youth Dental Service in Western Germany* (second edition) are: (1) Examination, subsequent examination and supervision (School Dental Service in its narrowest sense); (2) Early treatment; (3) Preventive measures.

Fig. 5.—Reserved for a tooth which will have a long life. (The background of this illustration was originally blue, with the word Reserviert white on orange.)

There are three ways of arranging dental treatment for children in Germany, either by direct attendance, i.e., the examination and treatment by the same school dentist; by a transfer system, i.e., the inspections are performed by the school dental officer and the children are referred to general practitioners for treatment, being re-inspected in due course to see that the treatment has, in fact, been carried out: this I found was the system in Frankfurt. Finally, there may be a combination of both, as in Offenbach, where I learned that the School Dental Officer examines all the children and treats something like 10 per cent, the rest being seen in general practice.

In addition to the treatment side, much propaganda about oral hygiene is distributed by this organization to children, teachers, and health visitors, etc. It is interesting to note that the teachers are required by law to teach this subject at least twice a year and this must act as a useful reminder to them.

In 1957 certain toothpaste manufacturers formed an organization in conjunction with the Youth Dental Service and other bodies to help to improve oral health. In co-operation with a public relations organization they put out press material, programmes for radio and T.V., articles for magazines, etc. In addition, they supply material such as posters, pamphlets (*Fig.* 5), and films for schools, the local authorities usually paying something towards their cost. Finally, they are hoping to organize shortly a Dental Health Week, when they will concentrate all their efforts on Hessen.

Dr. Braun, of Cologne, told me that his Association has a service which notifies them when any unfavourable dental propaganda is issued, for example, by certain toothpaste manufacturers, and if necessary they arrange to correct this by an appropriate article or interview, etc.

Finally, I found that in Hessen, Dr. Hensel is carrying out a quite extensive programme of administering fluoride tablets to schoolchildren, but at present no results are available. Incidentally, he thinks that the tablets may have a good effect on stimulating interest in dental health, quite apart from their more specific effect on teeth.

DISCUSSION

It has already been mentioned that no direct comparisons can be made between the countries visited and our own because of the widely differing backgrounds of dental care, and perhaps I may summarize these:—

1. In all three countries there are considerable difficulties in arranging any central organization to look after dental health propaganda, there being nothing quite equivalent to our Ministry of Health, or the proposed Standing Committee to which the McNair report referred.

2. Dental consciousness among the general public is obviously greater in these countries than here and more parents demand good conservative treatment. In addition, they are more aware of the need of good oral hygiene and probably there is less necessity for the teaching of this subject than in Britain.

3. The amount of decay in the children's teeth here appears to be rather higher than in either Germany or Italy, as may be seen from the following figures. In a 12-year-old group in Britain in 1953 the D.M.F. index was 3·8[7] (it is probably considerably higher now). The same age group in Hessen, Germany, showed a D.M.F. index of about 2·5–3·0 and in Italy[8] in a group up to 15–16 years of age it was found to be only 1·55–2·0. Here again our problem is more difficult from the treatment point of view, but it might indicate that there is more possibility for us to effect a reduction in decay by means of oral hygiene propaganda.

4. The ratio of dentists to population has already been referred to and we are certainly very much worse off here than these Continental countries and therefore some employment of auxiliary personnel, such as oral hygienists, is most necessary in Great Britain, although they are opposed to it in Germany and Switzerland.

In Britain probably the best way to organize an oral hygiene campaign would be to have a Central Advisory Body such as suggested by the McNair Committee and this should provide general guidance and necessary propaganda material such as pamphlets, posters, etc., the more detailed work in any particular area being carried out by the Local Authorities in co-operation with various bodies who would be interested, e.g., local dental and medical committees, teachers, etc. In this way, although there would be a general level of agreement in the various campaigns in the country, the people who knew the local conditions best would be in charge of the work in their own areas (*Fig.* 6).

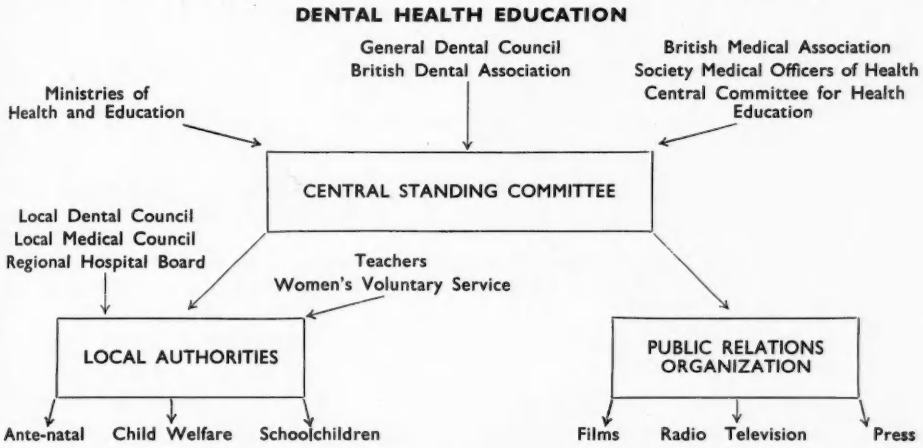

Fig. 6.—Chart showing the organization of dental education.

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THE ERUPTION OF THIRD MOLARS FOLLOWING EXTRACTION OF SECOND MOLARS*

By **D. I. SMITH**, F.D.S., D.Orth. R.C.S.

A GROUP of 113 orthodontic patients was investigated. In each case one or more second molars had been extracted during orthodontic treatment. Inadequate records led to the elimination of 45 cases and in a further 16 eruption is still taking place.

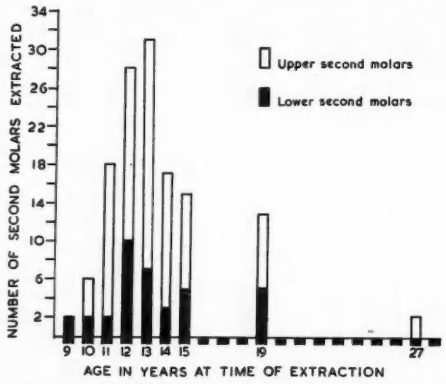


Fig. 1.—Showing age distribution of second molar extraction.

Complete eruption of 94 upper third molars and 34 lower third molars was observed. Age at the time of extraction varied between 9 years and 27 years. *Fig.* 1 illustrates the age distribution.

The third molars were examined clinically and radiographically with special reference to: (1) Occlusion with opposing teeth; (2) Presence of contact point mesially; (3) Axial inclination.

The lower third molars were compared with a standard (*see* [8] in *Fig.* 2 B). A lower third molar with an equal or lesser degree of tilt was classified as having an acceptable axial inclination.

RESULTS

UPPER THIRD MOLARS

TOTAL	IN OCCLUSION WITH OPPOSING TOOTH	MESIAL CONTACT POINT	ACCEPTABLE AXIAL INCLINATION
94	94	90	91

Three upper third molars were in buccal relationship to the lower arch.

Loss of four upper first molars accounted for absence of contact points and tilt of the neighbouring upper third molars.

LOWER THIRD MOLARS

TOTAL	IN OCCLUSION WITH OPPOSING TOOTH	MESIAL CONTACT POINT	ACCEPTABLE AXIAL INCLINATION
34	33	20	17

Three relevant lower first molars were lost owing to caries in this group.

In this small series there was no apparent correlation between age at the time of extraction of lower second molars and the final occlusion of lower third molars. The axial inclination of the developing lower third molars bore no obvious relationship to their eventual position.

CONCLUSION

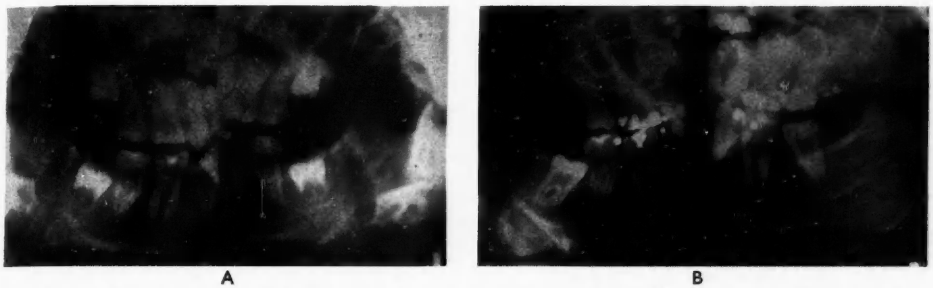
In the cases investigated the upper third molars erupted, almost without exception, into good position. The lower third molars exhibited a wider range of final position (*Figs.* 3–8). The majority erupted into occlusion, but were tilted in varying degrees.

DISCUSSION

There are several purely local factors to be considered before deciding to extract second

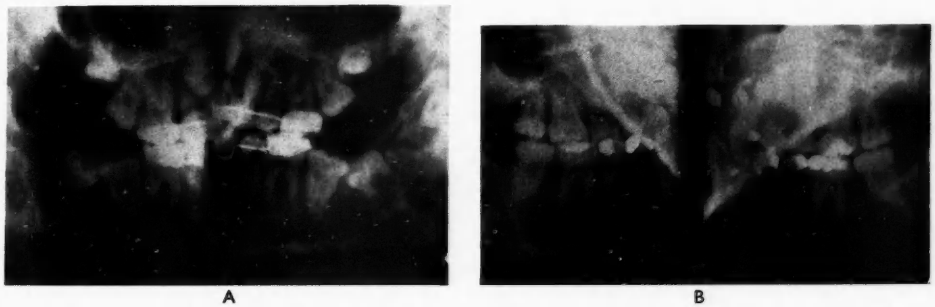
* Being a demonstration given at the meeting of the British Society for the Study of Orthodontics, held on May 13, 1957.

molars as part of orthodontic treatment:—There may be loss due to caries of first molars in the buccal segments from which second molars were removed. This occurred in 7 instances in the group investigated.



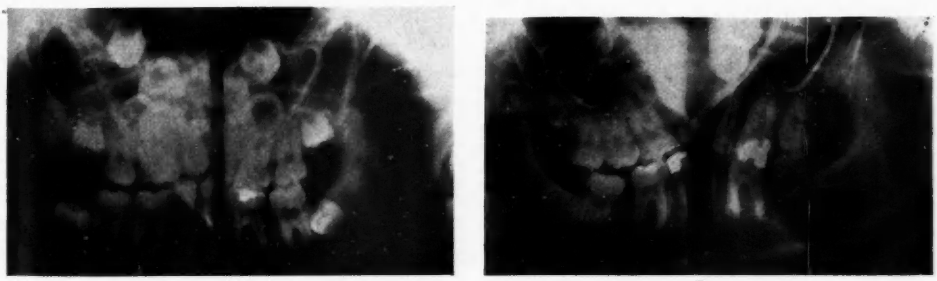
A B

Fig. 2.—*Case* 12. **A**, Right and left lateral oblique radiographs at age 12. The $\frac{|7}{7|}$ were extracted at age 13 years 2 months and $\overline{7|}$ at age 14 years 11 months. **B**, Right and left lateral oblique radiographs at age 17 following eruption of $\frac{8|8}{|8}$ at 17 years. The $\overline{|8}$ in this case was used as standard for the assessment of axial inclination. The failure to remove $\overline{7|}$ has provided a control in this case.



A B

Fig. 3.—*Case* 58. **A**, Right and left lateral oblique radiographs at 16 years. The $\frac{7|7}{7|7}$ were extracted at age 19 years 4 months. **B**, Right and left lateral oblique radiographs at 21 years following eruption of $\frac{8|8}{8|8}$ at 21 years. This represents the most favourable result in this series.



A B

Fig. 4.—*Case* 4. **A**, Right and left lateral oblique radiographs at 13 years, prior to extraction of $\underline{|7}$ at 13 years and $\overline{7|7}$ at 15 years. **B**, Right and left lateral oblique radiographs at 17 years following eruption of $\frac{8|8}{8|8}$ at 17 years. Note tilting of $\overline{8|8}$ and absence of mesial contact points.

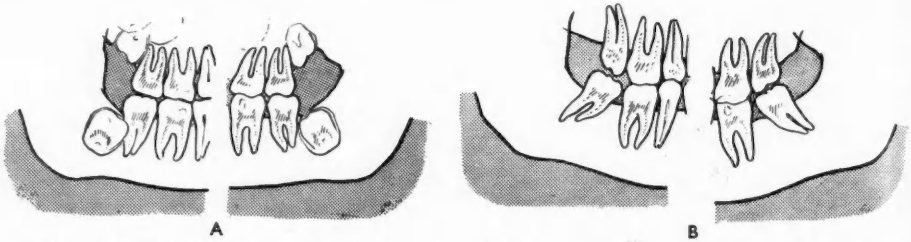


Fig. 5.—Radiographs taken: A, At 14 years of age, 1 year before removal of $\frac{7|7}{7|7}$; B, Two years after extraction.

Fig. 6.—Radiographs taken: A, At 11 years of age, 1 year before extraction of second molars; B, At 17 years of age.

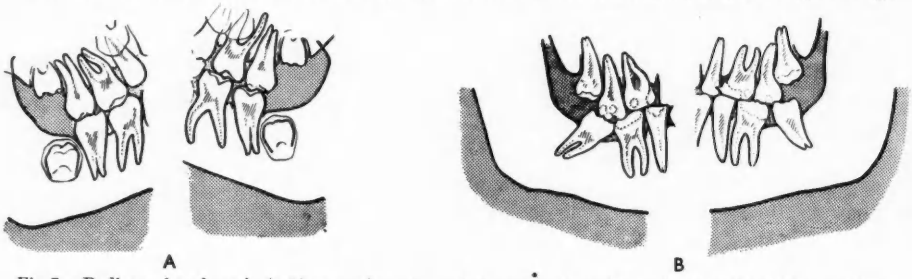


Fig. 7.—Radiographs taken: A, At 12 years of age, 1 year before extraction of second molars; B, At 18 years of age.

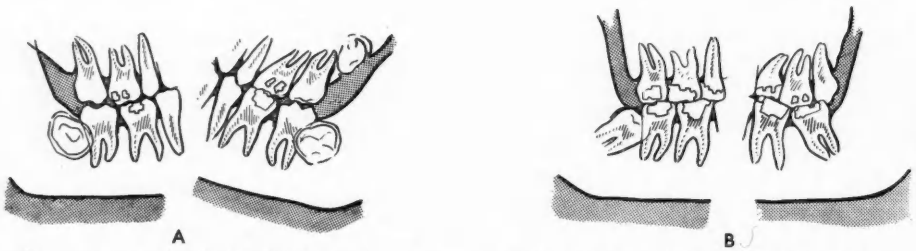


Fig. 8.—Radiographs taken: A, At 13 years of age, 2 years before extraction of second molars; B, At 19 years of age.

The third molar is frequently smaller than the second molar it is to replace, so that the eventual size of the tooth must be considered.

In the lower arch tilting and absence of contact point may be expected, but complications such as "pericoronitis" and the need for surgical removal are avoided.

AN INVESTIGATION INTO THE EFFECTS OF PRESSURE ON VARIOUS BONY SITES IN THE RABBIT*

By C. M. PERSTON, M.D.S. (Belfast), D.Orth. R.C.S.

Aim.—To explore the possibility of using mechanical forces, which are capable of modifying the form of alveolar bone, to modify the form of non-alveolar bone.

A review of the extensive relevant literature was not possible in the time available.

Appliances were designed to exert constant pressure on four bony sites in the rabbit for periods varying from 2 to 10 weeks; 51 experiments were completed. On recovery the material was sectioned and examined microscopically. In all, except the first series, the appliances were inserted under the skin.

First Series.—A pressure of 30 or 60 g. was exerted on the dorsal, medial, or lateral surfaces of the proximal phalanx of the toes of adult animals for 14 or 28 days, through the skin; 18 experiments were completed.

Sandal-like appliances were made in acrylic resin and attached to the feet of the animals. Springs fitted into tubes embedded in the resin. Where a spring contacted the skin the metal was covered in polythene tubing.

When a pressure of 60 g. was effective for 4 weeks on the dorsal surface of a phalanx small areas of resorption were observed, in the bone, deep to the source of pressure. On the medial and lateral surfaces large bony masses proliferated.

When a pressure of 30 g. was exerted on the medial or lateral surfaces of a phalanx the results were variable. In some cases small areas of resorption were seen deep to the source of pressure, while in others large masses of bone and cartilage had developed.

Second Series.—A pressure of 50 g. was exerted on the suture between the nasal bones in 3- and 6-month-old rabbits for 2 or 4 weeks. Hooks on each appliance fitted into grooves cut in the nasal bones superficial to the position of the conchæ on each side and so attachment was gained without penetrating into the nasal cavity. Nine such appliances were inserted.

On microscopical examination, in most cases, parts of the anterior half of the suture were acellular. Osteoclasts were present in the marrow spaces and in the suture adjacent to the cell-free regions.

In no completed experiment was there a measurable difference in the distance between the hooks at the beginning and at the end of the experiment.

Third Series.—Pressure was exerted across the epiphysial cartilage of the second metatarsus in 14 animals. The animals were 10, 15, or 16 weeks old at the start of the experiments, which lasted for 4 to 10 weeks. The appliances exerted a pressure of 50 g. when inserted. In the 10-week-old animals the growth of the cartilage further separated the legs of the appliance to the extent that in one case the cartilage bore a load of 900 g./sq. cm. of surface area. In most cases the bone in which the appliance was inserted was shorter than its corresponding bone in the other foot, but no significant change in the trabecular bone in the diaphysis could be demonstrated.

Fourth Series.—Pressure was applied to the periosteum of the anteromedial surface of the tibiæ, of 6-month-old animals, slightly distal to the proximal epiphysial cartilage. A pressure of 60 or 160 g. was applied for 4 or 10 weeks. Ten experiments were completed.

After 4 weeks the bone deep to the plate exerting pressure appeared thinner than that of the cortex, at a corresponding level, of the tibia of the other leg. Round the sides of the plate deposition of bone was taking place.

After 10 weeks the plates were completely surrounded by bone.

*Being a demonstration given at the meeting of the British Society for the Study of Orthodontics, held on May 13, 1957.

CONCLUSIONS

In general the results of this investigation do not support the hypothesis that mechanical appliances could be used clinically to modify, by pressure, the form of the non-alveolar bone of the jaws in the later stages of growth.

Where resorption of bone occurred as a result of applying pressure the resulting change in form was very small.

Where it could be recognized that deposition of bone resulted from the application of pressure the factors determining the form and distribution of the new bony masses could not be positively identified.

I am indebted to Mr. H. T. A. McKeag, on whose suggestion I undertook this investigation, for advice and criticism; to Professor J. J. Prichard for his permission to use the facilities of the Department of Anatomy, Queen's University, Belfast, and for advice and criticism; and to Dr. J. H. Scott for advice.

BOOK REVIEWS

DENTAL CLINICS OF NORTH AMERICA. November 1957 issue. Symposia on: I. Tumors of the Oral Region, ed. HAMILTON B. G. ROBINSON, D.D.S., M.S.; II. Modern Practice in Endodontics, ed. ROBERT G. KESEL, D.D.S., M.S. $8\frac{3}{4} \times 5\frac{3}{4}$ in. Pp. 619–924 + x. Fully illustrated. 1957. Philadelphia and London: W. B. Saunders Co. Published by Annual Subscription in three numbers—March, July, November. Price 98s. Annual Subscription.

THIS volume is the third of an annual trilogy in which, during the next few years, the publishers hope to cover the various specialties and branches of dentistry. Each book deals with two unrelated subjects, presumably designed to create maximum reader interest.

Each chapter has been written by an authority on the subject who is already well known to the readers of American journals and therefore the book becomes a symposium of modern American teaching. The main drawback to this type of publication is that the various authors have not been in a position to read the foregoing chapters and therefore a certain amount of repetition occurs as well as some conflict of ideas. To the discerning reader this can be of advantage, but as a text for the student it can lead to confusion.

For the general practitioner, however, who wishes to keep abreast of modern dental literature on these subjects, the material succeeds in being a very readable and up-to-date résumé of the diagnosis and treatment of oral tumours and the management of root canal cases.

The first section (140 pages) deals with the diagnosis, pathology and treatment of oral tumours. Chapter by chapter the various sections of the mouth are covered in a clear and concise manner. Nevertheless, one feels that too much is trying to be accomplished in too little space.

The second section is an excellent symposium on endodontia, giving an up-to-date appraisal of modern techniques. Chapters worthy of special mention are those by Maurice on the Selection of Teeth for Treatment; Ingle on Instrumentation; Sommer on Root Resection; and Dietz on the Bleaching of Discoloured Teeth. Stewart looks to the near future with the antihistamines in Canal Sterilization.

This latter section of the book can be highly recommended to anyone wishing a better understanding of the subject and to improve his endodontic service to his patients.

The volume also contains the cumulative index for the year's three publications.

D. D. D.

DENTAL PRACTITIONERS' FORMULARY 1957. For use in the National Health Service. $6\frac{1}{2} \times 4$ in. Pp. 49. 1957. London: The Pharmaceutical Press. 3s.

THE new and revised edition of the *Dental Practitioners' Formulary*, published and distributed to practitioners working in the General Dental Service, is a considerable improvement on the previous editions. The Formulary

section is much the same, with certain important additions and some deletions. Among the additions are capsules of Methylpentynol, and capsules and tablets of Phenoxymethylpenicillin. These will be welcomed, particularly as far as the treatment of children is concerned. It is to be hoped that Methylpentynol in the Elixir form will be added later, as the capsules are not readily taken by children. Other additions are Elixir Chloral and Aneurine compound tablets (strong). The drugs removed from the Third Schedule are Borax and Benzamine and Proflavine solution tablets and tablets of Nicotinamide and Nicotinic acid.

Valuable additions to the present edition are the notes for prescribers; these give guidance on the use of analgesics, hypnotics, and sedatives, and the control of infection with antibiotics and sulphonamides, which should prove very useful to the busy practitioner. The appendix contains the Third Schedule to the Dental Regulations and tables of Metric and Imperial Equivalents. D. F. S.

ABSTRACTS FROM OTHER JOURNALS

Some Aspects of Fractures of the Horizontal Ramus of the Mandible in Children

When fractures of the horizontal ramus are considered the end of childhood can be said to have arrived by the age of 12 because by then the permanent teeth with the exception of the third molar have erupted, the vertical height of the bone has increased by development of the alveolar process, and the bone closely resembles the adult bone in form and structure.

Twenty-one cases between the ages of 4 and 11 who sustained fracture have been studied, and the following observations made:—

1. Widespread extent of the fracture line due to—

a. more resilient bone and greater force necessary to fracture it, or

b. weak bone due to the presence of tooth crypts.

2. Presence of developing unerupted teeth in the fracture line which do not seem to affect the healing of the fracture. The developing teeth in the line of the fracture should not be extracted unless definitely indicated. When these do erupt, the following abnormalities may be noted:—

a. Arrest of growth,

b. Premature closure of the apical foramen,

c. Restricted formation of the roots,

d. Narrowing of the pulp chamber,

e. Radio-opaque deposits in the pulp.

3. Shorter period for union of the fracture.

4. Anatomical continuity of the bone must be restored with minimum delay.

5. The use of a suitable antibiotic is necessary to retain the teeth in the fracture line.

6. Orthodontic treatment may be necessary until dentition is complete.—LEWARS, P. H. D. (1957), *Brit. J. plast. Surg.*, **10**, 218.

Dental Aspects of Osteo-radio Necrosis

Even with the use of super voltage and improved radio therapy techniques, osteo-radio necrosis will continue to be a problem that confronts the radio-therapist, surgeon, and dentist.

Changes occurring in bone after irradiation appear to result from cellular damage as well as impaired vascularity. Histologic examination of bone obtained from excised irradiated mandibles demonstrated some loss of vascularity. The predominant change noted was the presence of a diffused fibrosis.

The excess of organisms into heavily irradiated tissue appears to be the primary influencing factor in the production of osteo-radio necrosis of the mandible. Other influencing factors are:—

1. Loss of vascularity from either surgery or radio-therapy, and

2. Recurrent neoplasm.

Where radiation is used in the treatment of oral cancer, all teeth in the path of X rays should be extracted and an alveolectomy performed prior to the initiation of therapy. This

applies only where a cancerocidal dose of radiation is contemplated.

The conservative method of treating osteoradio necrosis is preferable to the radical method, even though the period of morbidity is increased.—MIEBEL, H. H., and NEENAN, E. W. (1957), *Oral Surg.*, **10**, 1011.

Allergic Reaction to Periodontal Pack

A case report of a patient who showed allergic response to the oil of cloves and resin contained in a periodontal pack.

No reaction occurred when the pack was first applied after a gingivectomy, but on repacking one week later, after three days the patient complained of swelling of the right cheek, soreness and an itching sensation of the buccal mucosa, which exhibited many small vesicles, the area being limited to the part opposite the pack. On removal of the pack, the swelling subsided after two days. A further gingivectomy in another area was protected by the same type of pack and two days after operation a similar reaction occurred, the symptoms subsiding six hours after removal of the pack.

Patch tests to all constituents of the pack showed eugenol, four plus; powdered resin, two plus; solid resin, one plus; all other substances being negative. Use of a different pack consisting of zinc oxide, four parts; tannic acid, one part; peanut oil, one ounce; eucalyptol, two ounces; and pure white bleached beeswax, ten grammes, produced no untoward reaction.—ROMANOW, I. (1957), *J. Periodont.*, **28**, 151.

The Superiority of Topical Application of Stannous Fluoride on Primary Teeth

Two hundred and twenty-seven children were selected at random from the patients attending Indiana University Pedodontic Clinic and divided into three groups. Group I received 4 applications of 4 per cent stannous fluoride (*p*H 3). Group II received 4 applications of 2 per cent sodium fluoride (*p*H 7). The third group served as a control.

Before the first application of fluoride, all three groups received a thorough prophylaxis; the second, third, and fourth fluoride applications were completed within two weeks of the first. The treated teeth were isolated with cotton-wool dried in hot air, and then moistened continuously for four minutes by cotton applicators soaked in the appropriate solution.

Clinical examinations were performed by one of the authors, and these were accompanied by full mouth and bite-wing radiographs. Only primary teeth were included in the investigations.

The stannous fluoride group (average age 6·16 years) showed a significantly lowered caries increment over the first year of the test when compared with the control group (average age 7·13 years). The sodium fluoride group (average age 6·10 years) showed the same tendency, but this was not significant.

The authors claimed that stannous fluoride is far more effective than sodium fluoride when applied topically to teeth.—MCDONALD, R. E., and MUHLER, J. C. (1957), *J. Dent. Child.*, **24**, 84.

CHEVALIER BARTHOLOMEW RUSPINI

Attention was indirectly riveted on dental history on March 25, when a Ruspini Luncheon was held in London to mark the one-hundred-and-seventieth anniversary of Bartholomew Ruspini having founded, on March 25, 1788, the Royal Masonic Institution for Girls, now located at Rickmansworth Park. "The Immortal Memory" of the founder was proposed by Major-General A. H. Hornby, C.B., C.B.E., M.C. It is an interesting fact that this school, for the daughters of Freemasons who have lost one or both parents, has been under Royal patronage from the reign of George III to Elizabeth II.

The title of Chevalier was, in 1789, conferred on Ruspini, who, in Pall Mall, practised dentistry as a branch of surgery, and was a noted philanthropist. Three of his sons (two educated at Westminster School) were likewise engaged in dental practice. Many renowned artists, including George Romney, Sir William Beechey, Nathaniel Hone, and Francesco Bartolozzi, immortalized Ruspini by means of brush, crayon, and burin.